On relief maps vertical exaggeration is excusable and without doubt necessary, but it can hardly be said to be in text-book illustrations. Natural scenery is sufficiently imposing not to need to be made attractive by exaggeration, while correct illustrations strengthen the pupil's confidence in the truth of what he is taught.

I append a view of Popocatapetl as it is represented in a modern geography in common use in our schools, and, for comparison, a profile drawn from a photograph of the volcano as it appears from the valley of Puebla.

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On the Notation of Terrestrial Magnetic Quantities.

At the International Meteorological Congress to be held in Paris, a number of questions of special interest to magneticians have been proposed for discussion, among which is the following: The same notation should generally be employed, H for horizontal force, X for the northern component, Y for the western component, Z for the vertical force, and V for the potential. As the need of some uniform notation has been made apparent to me in connec tion with the journal *Terrestrial Magnetism*, I have been paying this matter some attention with the view of obtaining a concise and logical system for adoption in this journal.

The principle upon which I proceed is to take the first letter of a word designating a particular quantity, if at the same time it conforms with typographic requirements, such, for example, as declination, which is common to several languages. In this way I have thus far obtained the following: D for declination, I for inclination, H for horizontal component of force, V for vertical component, F for total force.

Upon examination it will be found that these letters stand for words derived in almost all cases originally from the Greek and Latin languages and, with but insignificant variations in spelling, common to several of the main modern languages. The Germans will be asked to yield a point with regard to F,* but this, as will be seen below, will be made up to them in the adoption of G for magnetic potential. V, taken from the Latin *vis* or I from *intensitas*, or D from the Greek word δύναμις, would not do for force, as they are already taken. Nor would T from *totus* or P from πᾶς answer, since the former is frequently used for time of vibration, and so in fact is the letter P, which stands besides for the first deflection coefficient. As I hope to be able to find satisfactory notation for all the principal magnetic quantities, I am keeping this matter constantly in mind in adopting any particular letter. The English and French have *force*, and I have, therefore, adopted F for total force. As it is frequently the custom to designate angular quantities by Greek letters, I should have preferred, had it been possible, to adopt δ and ι instead of D and I, but the Greek ι is a very unsatisfactory letter from a typographical standpoint. Moreover, if found desirable later on, the small letters d and i or δ and ι can be reserved for the variations on the mean of day and on the mean of year respectively.

I think it very much to be deplored if Z, as above proposed, be universally adopted to designate the vertical force. It should not be forgotten that the Gaussian mode of resolving the magnetic force into northerly component (X), westerly component (Y) and vertical component (Z) applies to a *local* system of coordinates, not to a fixed system, as the layman might naturally suppose, a fact which is even apparently forgotten at times by magneticians. The mean values of these components for a complete circuit of the earth along a parallel of latitude can, in consequence, no more be *physically* interpreted than the mean H, for example. I am therefore opposed to adopting a letter for the vertical force which in no way gives evidence of the exact quantity for which it stands. V, on the other hand, is logically connected with H and at the same time implies that the direction of the quantity that it symbolizes is *local*, the direction of the vertical or plumb line varying from point to point.

For the same reasons I am not in favor of adopting X for northerly component and Y for westerly component. Let authors choose this method of notation if they prefer it, but in a

*The initial letter of the German word *Kraft* is frequently used to designate the moment of inertia and hence will not answer for force.

system suggested for universal adoption it would seem to me that N and W would more satisfactorily meet the requirements, clearly indicating to the eye as they do the local character of the system of coordinates employed.

As a letter to designate the earth's magnetic potential, I believe none more fitting could be adopted than G after Gauss, the author of this function. Gauss himself used V, but this letter is not sufficiently characteristic; it is used to designate many other functions in mathematical physics; and there would, moreover, be a conflict in our system, since V seems the most logical letter to designate the vertical force.

L. A. BAUER.

LINDEN, MD., August 10, 1896.

SCIENTIFIC LITERATURE.

Memoirs of Frederick A. P. Barnard, D. D., LL. D., L. H. D., D. C. L., Tenth President of Columbia College. By JOHN FULTON. Columbia University Press. Macmillan & Co. 1896.

When a person has been for nearly sixty years deeply interested in the problems of education, and has himself contributed largely to their solution, his biography necessarily reads like the history of the progress of this science during that period. The life under review is no exception, and indeed his lively reminiscences of his own early school days carry the beginning of our period back to the time when our century was scarcely a baker's dozen years old.

Born May 5, 1809, at Sheffield, Mass., of old Puritan stock, Frederick Augustus Porter Bernard was a thorough New Englander. He has given a very vivid description of the isolation of the little village among the hills and its peculiar institutions, especially the 'meeting house' and all its associations. He says of this early period of his life, which he afterwards came to consider all important in the education of a child: "I believe that if there is anything good in me it must be owing to that loving maternal solicitude which gently swayed me toward the right, at a time when the bending of the twig sufficed to give its permanent inclination to the full grown tree." Soon after he could walk he was sent to the village school, and at four attended a 'grammar school.' At six he commenced the humanities with the village parson and was an interested reader of Shakespeare's comedies; with his mother he made the acquaintance of Cowper, Goldsmith, Addison, Burke and others. At the same time his ingenuity produced kites, windmills, waterwheels and the like, which were the objects of the envious admiration of his playmates. At the age of nine he went away to the Saratoga Academy, where along with much classics he learned the printer's trade, an incident which undoubtedly was the beginning of that interest in journalism which resulted later in so much editorial work. When only twelve he was sent to the Stockbridge Academy to prepare for Yale, where he entered three years later (1824), the youngest member of his class. One will be amply repaid for reading his lively and often amusing accounts of his life at the preparatory school, and especially his description of contemporary life at Yale. Graduated second in his class in 1828, he was appointed teacher in the Hartford Grammar School. These two years of life in Hartford prior to his appointment at Yale were full of new experiences and ventures, especially as an author and an editor, and at this early date he evinced that liking and aptness for newspaper controversy that stood him in such good stead in his after life.

When Barnard was appointed to teach at Yale it had been the custom for each tutor to take his share of the entering class and teach them all the branches during their first three years. As an undergraduate he had seen the weakness of this method, and his first act at Yale was to persuade the faculty to permit the division for the first three classes by subjects instead of by numbers, thus starting a much needed change. After one year of service he was so troubled by increasing deafness that he resigned from Yale and threw himself heartily into the instruction of the deaf mutes at the Hartford Institution. Removing in 1832 to the similar institution in New York city, he labored zealously and happily until his call to the University of Alabama early in 1838.

During the sixteen years of his stay at Tuskaloosa, Barnard began the campaign for good